

Amendment to the Claims:

This listing of claims replaces all prior versions, and listings, of claims in the application and preliminary amendment.

Listing of Claims:

Claim 1 (currently amended): A polymer solution for the efficient separation of charged macromolecules by electrophoresis comprising a plurality of polymers, wherein said polymers are different, do not phase separate when dissolved in solution and are entangled to form an interpenetrating network, wherein said interpenetrating network is prepared by synthesizing a first polymer in a matrix of a second polymer.

Claim 2 (original): A polymer solution in accordance with Claim 1, wherein said polymers are neutral and water-soluble.

Claim 3 (original): A polymer solution in accordance with Claim 1, wherein at least one of said polymers is polyacrylamide (“PAM”), N-substituted PAM, N,N-disubstituted PAM, modified polysaccharides, polyethylene oxide (“PEO”), polyvinylpyrrolidone (“PVP”), polyvinylalcohol (“PVA”), polyethylene glycol (“PEG”), or a random, a graft or a block copolymer based on the backbone monomer segments thereof, wherein nitrogen substitutes are selected from the group consisting of C₁ to C₃ alkyl, hydroxyl-substituted C₁ to C₃ alkyl, and methoxy-substituted C₁ to C₃ alkyl.

Claim 4 (original): A polymer solution in accordance with Claim 3, wherein said random, graft or block copolymer is EPE-type, N,N-dimethylacrylamide and N,N-diethylacrylamide (“P(DMA/DEA”), a copolymer of poly(N-isopropylacrylamide) densely grafted with short poly(ethylene oxide) (“PNIPAM-g-PEO”) or polyacrylamide-co-allyl-β-D-glucopyranoside (“P(AM/AG”).

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Claim 5 (original): A polymer solution in accordance with Claim 3, wherein said polysaccharides are selected from the group consisting of liquified agrose, methylcellulose ("MC"), hydroxyethylcellulose ("HEC"), hydroxypropyl-methyl-cellulose ("HPMC"), hydroxypropylcellulose ("HPC"), glucomannan, galactomannan and dextran.

Claim 6 (original): A polymer solution in accordance with Claim 1, wherein at least one of said polymers is a silica-absorbing polymer that suppresses electrophoendoosmotic flow and charged macromolecule-silica interactions.

Claim 7 (original): A polymer solution in accordance with Claim 6, wherein said silica-absorbing polymer is selected from the group consisting of PVP, PEO, EPE-type, N-substituted PAM and N,N-disubstituted PAM, and wherein nitrogen substitutes are selected from the group consisting of C₁ to C₃ alkyl, hydroxyl-substituted C₁ to C₃ alkyl, and methoxy-substituted C₁ to C₃ alkyl.

Claim 8 (original): A polymer solution in accordance with Claim 1, wherein said interpenetrating network has a more expanded structural formation than the entanglement structure of a corresponding homopolymer solution, and has a larger effective size than that of a corresponding homopolymer solution, representing an effective entanglement network greater than that of the corresponding homopolymers, and wherein said interpenetrating network has a lower molecular weight per volume than the corresponding homopolymers.

Claim 9 (cancelled).

Claim 10 (original): A polymer solution in accordance with Claim 1, wherein said polymer solution provides at least a 500-base read length in one run for a single-stranded DNA separation.

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Claim 11 (cancelled).

Claim 12 (cancelled).

Claim 13 (cancelled).

Claim 14 (cancelled).

Claim 15 (cancelled).

Claim 16 (cancelled).

Claim 17 (cancelled).

Claim 18 (cancelled).

Claim 19 (cancelled).

Claim 20 (cancelled).

Claim 21 (cancelled).

Claim 22 (cancelled).

Claim 23 (cancelled).

Claim 24 (cancelled).

Claim 25 (cancelled).

Claim 26 (cancelled).

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Claim 27 (cancelled).

Claim 28 (cancelled).

Claim 29 (cancelled).